

Amendments to the Claims:

This listing of claims will replace all prior version, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A method for media delivery in a network, comprising the steps of:

(a) determining an available bandwidth for completion of a file transmission for a time interval, wherein the time interval is a current time plus a maximum duration for a completion of at least one file transmission task, comprising:

(a1) determining a plurality of live-video stream (LVS) jobs to begin during the time interval,

(a2) allocating bandwidth to the plurality of LVS jobs not yet allocated bandwidth, and

(a3) determining the available bandwidth for completion of the file transmission for the time interval after the bandwidth allocation to the plurality of LVS jobs; and

(b) allocating at least a portion of the available bandwidth to complete the at least one file transmission task, wherein each of the at least one file transmission task may be allocated a different amount of the available bandwidth.

2. (Previously Presented) The method of claim 1, which includes the step of initializing a bandwidth allocation scheduler prior to the determining step (a), comprising the steps of:

(a1) obtaining a plurality of system configuration parameters from a plurality of database tables;

(a2) initializing a global step function (GSF), wherein the GSF represents a total maximum bandwidth available in the network in the time interval for completion of the file transmission; and

(a3) subtracting from the GSF bandwidth requirements for a plurality of on-going live-video stream (LVS) jobs and LVS jobs planned from a time of initialization to a maximum transmission duration.

3. (Original) The method of claim 2, wherein the subtracting step (a3) comprises the steps of:

(a3i) recording in the plurality of database tables the LVS jobs and their bandwidth requirements;

(a3ii) subtracting from the GSF the bandwidth requirements for the LVS jobs; and

(a3iii) logging a total remaining available bandwidth that can be scheduled for file transmissions in the plurality of database tables.

4. (Canceled)

5. (Canceled)

6. (Currently Amended) The method of claim 5 1, wherein prior to the reading allocating step (a1i- a2) comprises the steps of:

(a2i) updating a total available bandwidth for the time interval;

(a1iA a2ii) determining if the updating of the total available bandwidth occurs often enough to avoid conflicts with the plurality of LVS jobs; and

(a1iB a2iii) reporting an error if the updating does not occur often enough to avoid conflicts with the plurality of LVS jobs.

7. (Currently Amended) The method of claim 5 1, wherein the allocating step (a1ii a2) comprises the step of:

(a1iiiA a2i) subtracting from a GSF the bandwidth requirements for the plurality of LVS jobs, wherein the GSF represents a total maximum bandwidth available in the network in the time interval for completion of the file transmission.

8. (Previously Amended) A method for media delivery in a network, comprising the steps of:

(a) determining an available bandwidth for file transmission for a time interval, comprising the steps of:

(a1) updating a total available bandwidth for the time interval, comprising the steps of:

(a1i) reading from a plurality of database tables a plurality of live-video stream (LVS) jobs to begin during the time interval,

(a1ii) allocating bandwidth to the plurality of LVS jobs not yet allocated bandwidth, and

(a1iii) recording the allocated bandwidth to the plurality of LVS jobs in the plurality of database tables, and

(a2) checking for the available bandwidth for file transmission for the time interval, comprising the steps of:

(a2i) updating a global step function (GSF),

(a2ii) determining if enough bandwidth is available for file transmissions,
(a2iii) sending an indication if there is not enough bandwidth available for file transmission, and

(a2iv) finding a bandwidth strip which begins at a current time, fits under the GSF, has at least a minimum amount of bandwidth that must be allocated to a file transmission task, and does not extend, in the X/time-direction, beyond a latest delivery time (LDT) of the at least one transmission task; and

(b) allocating at least a portion of the available bandwidth to at least one file transmission task, wherein each of the at least one file transmission task may be allocated a different amount of the available bandwidth.

9. (Original) The method of claim 8, wherein the finding step (a2iv) comprises the step of:

(a2ivA) finding the bandwidth strip that extends in an X/time-direction from a current time to no more than a maximum transmission duration, and in a Y/bandwidth-direction from zero to no more than a value of the GSF at any X/time value spanned by the bandwidth strip;

(a2ivB) determining if an area of the bandwidth strip is no smaller than a predetermined area;

(a2ivC) indicating not enough bandwidth for file transmission if the area of the largest found bandwidth strip is smaller than the predetermined area, or is not within a plurality of pre-determined boundary conditions; and

(a2ivD) returning a size limitation for the at least one file transmission task if the area of the bandwidth strip is smaller than the predetermined area.

10. (Previously Amended) A method for media delivery in a network, comprising the steps of:

- (a) determining an available bandwidth for file transmission for a time interval; and
- (b) allocating at least a portion of the available bandwidth to at least one file

transmission task, wherein each of the at least one file transmission task may be allocated a different amount of the available bandwidth, comprising the steps of:

- (b1) setting an upper bound on an amount of bandwidth to a smaller of the available bandwidth and a maximum bit rate of a plurality of receivers,
- (b2) gathering data for the at least one file transmission task, the gathered data including a size of the at least one file transmission task,
- (b3) determining an allocation strategy selected by a customer,
- (b4) computing an overhead for the at least one file transmission task,
- (b5) allocating the portion of the available bandwidth based on the upper bound, the size of the at least one transmission task, the computed overhead, and the allocation strategy selected by the customer, and
- (b6) recording the available bandwidth remaining after the allocation in a plurality of database tables.

11. (Original) The method of claim 10, wherein the allocation strategy comprises at least one of:

- a Minimum Possible Bandwidth allocation strategy; and
- a Maximum Possible Bandwidth allocation strategy.

12. (Original) The method of claim 10, wherein the computing step (b4) comprises the

steps of:

(b4i) computing a total transmission overhead for the at least one file transmission task;

and

(b4ii) converting the task size and the total transmission overhead into an area.

13. (Original) The method of claim 10, wherein the allocating step (b5) comprises the steps of:

(b5i) determining if the at least one file transmission task can be completed before a deadline;

(b5ii) returning an error if the at least one file transmission task can not be completed before the deadline;

(b5iii) allocating a lowest possible bandwidth strip to meet the deadline to the at least one file transmission task if the bandwidth allocation strategy is Minimum Possible Bandwidth;

(b5iv) allocating a highest possible bandwidth strip to meet the deadline if the bandwidth allocation strategy is Maximum Possible Bandwidth;

(b5v) determining if the allocating step (b5iv) completed successfully;

(b5vi) returning an error if the allocating step (b5iv) did not complete successfully; and

(b5vii) setting the allocated bandwidth and duration of allocation in the task data if the allocating step (b5iv) completed successfully.

14. (Previously Presented) The method of claim 1, further comprising:

(c) freeing any allocated available bandwidth unused by a complete transmission of the at least one file transmission task.

15. (Currently Amended) A method for media delivery in a network, comprising the steps of: The method of claim 14, wherein the freeing step (c) comprises the steps of:

- (a) determining an available bandwidth for completion of a file transmission for a time interval, wherein the time interval is a current time plus a maximum duration for a completion of at least one file transmission task;
- (b) allocating at least a portion of the available bandwidth to complete the at least one file transmission task, wherein each of the at least one file transmission task may be allocated a different amount of the available bandwidth; and
- (c) freeing any allocated available bandwidth unused by a complete transmission of the at least one file transmission task, comprising:
 - (c1) updating a global step function (GSF), wherein the GSF represents a total maximum bandwidth available in the network in the time interval for completion of the file transmission;
 - (c2) constructing a payback strip from the portion of the available bandwidth allocated to the at least one file transmission task;
 - (c3) adding the payback strip to the GSF; and
 - (c4) recording an available bandwidth remaining after the adding step (c3) in a plurality of database tables.

16. (Previously Amended) A method for media delivery in a network, comprising the steps of:

- (a) determining an available bandwidth for file transmission for a time interval;
- (b) allocating at least a portion of the available bandwidth to at least one file transmission task, wherein each of the at least one file transmission task may be allocated a

different amount of the available bandwidth; and

(c) freeing any allocated available bandwidth unused by a transmission of the at least one file transmission task, comprising the steps of:

(c1) updating a global step function (GSF),

(c2) constructing a payback strip from the portion of the available bandwidth allocated to the at least one file transmission task, comprising the steps of:

(c2i) finding an expiration time corresponding to the at least one file transmission task in the plurality of database tables, and

(c2ii) constructing the payback strip that extends in an X/time-direction until the expiration time and in a Y/bandwidth direction from zero to the portion of the available bandwidth allocated to the at least one file transmission task,

(c3) adding the payback strip to the GSF, and

(c4) recording an available bandwidth remaining after the adding step (c3) in a plurality of database tables.

17. (Previously Presented) The method of claim 1, wherein the at least one file transmission tasks is scheduled back-to-back when duration of allocations are known when the allocations are made.

18. (Original) The method of claim 1, wherein the allocation of the available bandwidth to the at least one file transmission task is varied as a polynomial in time.

19. (Currently Amended) A computer readable medium with program instructions for media delivery in a network, the instructions for:

(a) determining an available bandwidth for completion of a file transmission for a time interval, wherein the time interval is a current time plus a maximum duration for a completion of at least one file transmission task, comprising:

(a1) determining a plurality of live-video stream (LVS) jobs to begin during the time interval,

(a2) allocating bandwidth to the plurality of LVS jobs not yet allocated bandwidth, and

(a3) determining the available bandwidth for completion of the file transmission for the time interval after the bandwidth allocation to the plurality of LVS jobs; and

(b) allocating at least a portion of the available bandwidth to complete the at least one file transmission task, wherein each of the at least one file transmission task may be allocated a different amount of the available bandwidth.

20. (Previously Presented) The medium of claim 19, which includes instructions for initializing a bandwidth allocation scheduler prior to the determining instruction (a), comprising the instructions for:

(a1) obtaining a plurality of system configuration parameters from a plurality of database tables;

(a2) initializing a global step function (GSF), wherein the GSF represents a total maximum bandwidth available in the network in the time interval for completion of the file transmission; and

(a3) subtracting from the GSF bandwidth requirements for a plurality of on-going live-video stream (LVS) jobs and LVS jobs planned from a time of initialization to a maximum transmission duration.

21. (Original) The medium of claim 20, wherein the subtracting instruction (a3) comprises the instructions for:

- (a3i) recording in the plurality of database tables the LVS jobs and their bandwidth requirements;
- (a3ii) subtracting from the GSF the bandwidth requirements for the LVS jobs; and
- (a3iii) logging a total remaining available bandwidth that can be scheduled for file transmissions in the plurality of database tables.

22. (Canceled)

23. (Canceled)

24. (Currently Amended) The medium of claim 23 19, wherein prior to the ~~reading~~ ~~allocating~~ instruction (a1i a2) comprises the instructions for:

~~(a2i) updating a total available bandwidth for the time interval;~~

~~(a1iA a2ii) determining if the updating of the total available bandwidth occurs often enough to avoid conflicts with the plurality of LVS jobs; and~~

~~(a1iB a2iii) reporting an error if the updating does not occur often enough to avoid conflicts with the plurality of LVS jobs.~~

25. (Currently Amended) The medium of claim 23 19, wherein the allocating instruction (a1ii a2) comprises the instructions for:

~~(a1iiA a2i) subtracting from a GSF the bandwidth requirements for the plurality of LVS jobs, wherein the GSF represents a total maximum bandwidth available in the network in the time~~

interval for completion of the file transmission.

26. (Previously Amended) A computer readable medium with program instructions for media delivery in a network, the instructions for:

(a) determining an available bandwidth for file transmission for a time interval, comprising the instructions for:

(a1) updating a total available bandwidth for the time interval, comprising the instructions for:

(a1i) reading from a plurality of database tables a plurality of live-video stream (LVS) jobs to begin during the time interval,

(a1ii) allocating bandwidth to the plurality of LVS jobs not yet allocated bandwidth, and

(a1iii) recording the allocated bandwidth to the plurality of LVS jobs in the plurality of database tables, and

(a2) checking for the available bandwidth for file transmission for the time interval, comprising the steps of:

(a2i) updating a global step function (GSF),

(a2ii) determining if enough bandwidth is available for file transmissions,

(a2iii) sending an indication if there is not enough bandwidth available for file transmission, and

(a2iv) finding a bandwidth strip which begins at a current time, fits under the GSF, has at least a minimum amount of bandwidth that must be allocated to a file transmission task, and does not extend, in the X/time-direction, beyond a LDT of the at least one transmission task; and

(b) allocating at least a portion of the available bandwidth to at least one file transmission task, wherein each of the at least one file transmission task may be allocated a different amount of the available bandwidth.

27. (Original) The medium of claim 26, wherein the finding instruction (a2iv) comprises the instructions for:

(a2ivA) finding the bandwidth strip that extends in an X/time-direction from a current time to no more than a maximum transmission duration, and in a Y/bandwidth-direction from zero to no more than a value of the GSF at any X/time value spanned by the bandwidth strip;

(a2ivB) determining if an area of the bandwidth strip is no smaller than a predetermined area;

(a2ivC) indicating not enough bandwidth for file transmission if the area of the largest found bandwidth strip is smaller than the predetermined area, or is not within a plurality of pre-determined boundary conditions; and

(a2ivD) returning a size limitation for the at least one file transmission task if the area of the bandwidth strip is smaller than the predetermined area.

28. (Previously Amended) A computer readable medium with program instructions for media delivery in a network, the instructions for:

(a) determining an available bandwidth for file transmission for a time interval; and

(b) allocating at least a portion of the available bandwidth to at least one file transmission task, wherein each of the at least one file transmission task may be allocated a different amount of the available bandwidth, comprising the instructions for:

(b1) setting an upper bound on an amount of bandwidth to a smaller of the

available bandwidth and a maximum bit rate of a plurality of receivers,

(b2) gathering data for the at least one file transmission task, the gathered data including a size of the at least one file transmission task,

(b3) determining an allocation strategy selected by a customer,

(b4) computing an overhead for the at least one file transmission task,

(b5) allocating the portion of the available bandwidth based on the upper bound,

the size of the at least one transmission task, the computed overhead, and the allocation strategy selected by the customer, and

(b6) recording the available bandwidth remaining after the allocation in a plurality of database tables.

29. (Original) The medium of claim 28, wherein the allocation strategy comprises at least one of:

a Minimum Possible Bandwidth allocation strategy; and

a Maximum Possible Bandwidth allocation strategy.

30. (Original) The medium of claim 28, wherein the computing instruction (b4) comprises the steps of:

(b4i) computing a total transmission overhead for the at least one file transmission task;

and

(b4ii) converting the task size and the total transmission overhead into an area.

31. (Original) The medium of claim 28, wherein the allocating instruction (b5) comprises the instructions for:

(b5i) determining if the at least one file transmission task can be completed before a deadline;

(b5ii) returning an error if the at least one file transmission task can not be completed before the deadline;

(b5iii) allocating a lowest possible bandwidth strip to meet the deadline to the at least one file transmission task if the bandwidth allocation strategy is Minimum Possible Bandwidth;

(b5iv) allocating a highest possible bandwidth strip to meet the deadline if the bandwidth allocation strategy is Maximum Possible Bandwidth;

(b5v) determining if the allocating step (b5iv) completed successfully;

(b5vi) returning an error if the allocating step (b5iv) did not complete successfully; and

(b5vii) setting the allocated bandwidth and duration of allocation in the task data if the allocating step (b5iv) completed successfully.

32. (Previously Presented) The medium of claim 19, further comprising instructions for:

(c) freeing any allocated available bandwidth unused by a complete transmission of the at least one file transmission task.

33. (Currently Amended) A computer readable medium with program instructions for media delivery in a network, the instructions for: The medium of claim 32, wherein the freeing instruction (c) comprises the instructions for:

(a) determining an available bandwidth for completion of a file transmission for a time interval, wherein the time interval is a current time plus a maximum duration for a completion of at least one file transmission task;

(b) allocating at least a portion of the available bandwidth to complete the at least one file transmission task, wherein each of the at least one file transmission task may be allocated a different amount of the available bandwidth;

(c) freeing any allocated available bandwidth unused by a complete transmission of the at least one file transmission task, comprising:

(c1) updating a global step function (GSF), wherein the GSF represents a total maximum bandwidth available in the network in the time interval for completion of the file transmission;

(c2) constructing a payback strip from the portion of the available bandwidth allocated to the at least one file transmission task;

(c3) adding the payback strip to the GSF; and

(c4) recording an available bandwidth remaining after the adding step (c3) in a plurality of database tables.

34. (Previously Amended) A computer readable medium with program instructions for media delivery in a network, the instructions for:

(a) determining an available bandwidth for file transmission for a time interval;

(b) allocating at least a portion of the available bandwidth to at least one file transmission task, wherein each of the at least one file transmission task may be allocated a different amount of the available bandwidth; and

(c) freeing any allocated available bandwidth unused by a transmission of the at least one file transmission task, comprising the instructions for:

(c1) updating a global step function (GSF),

(c2) constructing a payback strip from the portion of the available bandwidth

allocated to the at least one file transmission task, comprising the instructions for:

(c2i) finding an expiration time corresponding to the at least one file transmission task in the plurality of database tables, and

(c2ii) constructing the payback strip that extends in an X/time-direction until the expiration time and in a Y/bandwidth direction from zero to the portion of the available bandwidth allocated to the at least one file transmission task,

(c3) adding the payback strip to the GSF, and

(c4) recording an available bandwidth remaining after the adding step (c3) in a plurality of database tables.

35. (Previously Presented) The medium of claim 19, wherein the at least one file transmission tasks is scheduled back-to-back when duration of allocations are known when the allocations are made.

36. (Original) The medium of claim 19, wherein the allocation of the available bandwidth to the at least one file transmission task is varied as a polynomial in time.

37. (Previously Amended) A method for media delivery in a network, comprising the steps of:

(a) initializing a global step function (GSF), wherein the GSF represents a total maximum bandwidth available in the network in a time interval, wherein the time interval is a current time plus a maximum duration for completion of a file transmission;

(b) updating the GSF based upon bandwidth requirements for a plurality of live-video stream (LVS) jobs for the time interval;

(c) determining a size of at least one file transmission task which can be completely transmitted during the time interval based upon the updated GSF; and

(d) allocating at least a portion of the updated GSF to complete the at least one file transmission task based upon the size and an allocation strategy, wherein each of the at least one transmission task may be allocated a different amount of bandwidth.

38. (Previously Amended) A computer readable medium with program instructions for media delivery in a network, the instructions for:

(a) initializing a global step function (GSF), wherein the GSF represents a total maximum bandwidth available in the network in a time interval, wherein the time interval is a current time plus a maximum duration for completion of a file transmission;

(b) updating the GSF based upon bandwidth requirements for a plurality of live-video stream (LVS) jobs for the time interval;

(c) determining a size of at least one file transmission task which can be completely transmitted during the time interval based upon the updated GSF; and

(d) allocating at least a portion of the updated GSF to complete the at least one file transmission task based upon the size and an allocation strategy, wherein each of the at least one transmission task may be allocated a different amount of bandwidth.

39. (Currently Amended) A method for media delivery in a network, comprising the steps of:

(a) determining an available bandwidth for completion of a file transmission for each of a plurality of time intervals, wherein each time interval is a current time plus a maximum duration for a completion of at least one file transmission task, comprising:

(a1) determining a plurality of live-video stream (LVS) jobs to begin during the time interval,

(a2) allocating bandwidth to the plurality of LVS jobs not yet allocated bandwidth, and

(a3) determining the available bandwidth for completion of the file transmission for the time interval after the bandwidth allocation to the plurality of LVS jobs; and

(b) allocating at least a portion of the available bandwidth to complete the at least one file transmission task for each time interval, wherein each of the at least one file transmission task may be allocated a different amount of the available bandwidth, wherein the at least one file transmission tasks for each time interval are scheduled back-to-back.

40. (Currently Amended) A computer readable medium with program instructions for media delivery in a network, the instructions for:

(a) determining an available bandwidth for completion of a file transmission for each of a plurality of time intervals, wherein each time interval is a current time plus a maximum duration for a completion of at least one file transmission task, comprising:

(a1) determining a plurality of live-video stream (LVS) jobs to begin during the time interval,

(a2) allocating bandwidth to the plurality of LVS jobs not yet allocated bandwidth, and

(a3) determining the available bandwidth for completion of the file transmission for the time interval after the bandwidth allocation to the plurality of LVS jobs; and

(b) allocating at least a portion of the available bandwidth to complete the at least one file transmission task for each time interval, wherein each of the at least one file transmission

task may be allocated a different amount of the available bandwidth, wherein the at least one file transmission tasks for each time interval are scheduled back-to-back.

41. (Currently Amended) A method for media delivery in a network, comprising the steps of:

(a) determining an available bandwidth for completion of a file transmission for a time interval, wherein the time interval is a current time plus a maximum duration for a completion of at least one file transmission task, comprising:

(a1) determining a plurality of live-video stream (LVS) jobs to begin during the time interval,

(a2) allocating bandwidth to the plurality of LVS jobs not yet allocated bandwidth, and

(a3) determining the available bandwidth for completion of the file transmission for the time interval after the bandwidth allocation to the plurality of LVS jobs; and

(b) allocating at least a portion of the available bandwidth to complete the at least one file transmission task, wherein each of the at least one file transmission task may be allocated a different amount of the available bandwidth, wherein the allocated available bandwidth varies as a polynomial in time.

42. (Currently Amended) A computer readable medium with program instructions for media delivery in a network, the instructions for:

(a) determining an available bandwidth for completion of a file transmission for a time interval, wherein the time interval is a current time plus a maximum duration for a completion of at least one file transmission task, comprising:

(a1) determining a plurality of live-video stream (LVS) jobs to begin during the time interval,

(a2) allocating bandwidth to the plurality of LVS jobs not yet allocated bandwidth, and

(a3) determining the available bandwidth for completion of the file transmission for the time interval after the bandwidth allocation to the plurality of LVS jobs; and

(b) allocating at least a portion of the available bandwidth to complete the at least one file transmission task, wherein each of the at least one file transmission task may be allocated a different amount of the available bandwidth, wherein the allocated available bandwidth varies as a polynomial in time.

43. (Currently Amended) A system, comprising:

a server, comprising a manager for file transmissions via a satellite transponder, wherein the manager comprises a bandwidth allocation scheduler, the bandwidth allocation scheduler capable of determining an available bandwidth for completion of a file transmission for a time interval, wherein the time interval is a current time plus a maximum duration for a completion of at least one transmission task, and allocating at least a portion of the available bandwidth to complete the at least one file transmission task, wherein a different amount of the available bandwidth may be allocated to each of a plurality of file transmission tasks,

wherein the in determining the available bandwidth, the bandwidth allocation scheduler is capable: determining a plurality of live-video stream (LVS) jobs to begin during the time interval, allocating bandwidth to the plurality of LVS jobs not yet allocated bandwidth, and determining the available bandwidth for completion of the file transmission for the time interval after the bandwidth allocation to the plurality of LVS jobs; and

a database table coupled to the server, comprising information required by the manager for file transmissions.

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